

## ABSTRACT

The present invention relates to the mitogen-activated protein kinase called MAPK5. The rice MAPK5 gene, its protein and kinase activity were induced by abscisic acid, pathogen infection, wounding, drought, salt and cold temperature. However, suppression of *MAPK5* expression and kinase activity in dsRNAi transgenic plants resulted in constitutive expression of pathogenesis-related genes such as *PR-1* and *PR-10* but enhanced resistance to fungal and bacterial pathogens. In contrast, overexpressed transgenic lines exhibited elevated MAPK5 kinase activity and increased tolerance to drought, salt and cold stresses. This invention provides methods for increasing tolerance to abiotic and biotic stress in plant using MAPK5.